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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/848,563 | 05/03/2001 | David M. Pepper | B-3896 617785-5 | 6818 |

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| EXAMINER | |
|---|---|
| PHAN, HANH | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2638 | |

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/848,563 | PEPPER, DAVID M. | |
| | Examiner | Art Unit | |
| | Hanh Phan | 2638 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03 May 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-5 and 7-68* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-5 and 7-10* is/are allowed.

6)☒ Claim(s) *11-23,32-47,51-56 and 63-68* is/are rejected.

7)☒ Claim(s) *24-31,48-50 and 58-62* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. This Office Action is responsive to the Amendment filed on 04/15/2005.

2. The restriction requirement mailed on 08/09/2005 is withdrawn.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 11, 16, 45 and 68 are rejected under 35 U.S.C. 102(e) as being anticipated by Willebrand (US Patent No. 6,239,888).

Regarding claims 11 and 68, referring to Figures 1 and 4, Willebrand teaches a method of creating an optical link (i.e., link 24a, Fig. 1) between a first and a second station (i.e., first station 22c and second station 22d, Fig. 1) for the purpose of exchanging information between the two stations, the method comprising the steps of:

(a) providing a first optical beam (i.e., first optical beam 24a, Fig. 1) emanating from the first station (i.e., first station 22c, Fig. 1), and a second optical beam (i.e., second optical beam 24a, Fig. 1) emanating from the second station (i.e., second station 22d, Fig. 1);

(b) pointing the first optical beam and the second optical beam to a common location (i.e., free space repeater 28c, Fig. 1);

(c) directing (i.e., free space repeater 28c, Figs. 1 and 4) each beam into a reverse direction of the other so that each station receives the beam which emanated from the other station; and

(d) correcting (i.e., adjustment mechanism 56, Fig. 4) propagation distortions of the first and second optical beams (i.e., beams 24, Fig. 4)(see col. 7, lines 16-24 and col. 9, lines 3-26).

Regarding claims 16 and 45, referring to Figures 1 and 4, Willebrand teaches an interconnect (i.e., free space repeater 28c, Fig. 1) for optically interconnecting a first station (i.e., first station 22c, Fig. 1) and a second station (i.e., second station 22d, Fig. 1), the interconnect (i.e., free space repeater 28c, Fig. 1) comprising:

a first adaptive optical module (i.e., transmitting beam focusing element 44, receiving beam focusing element 32 and adjustment mechanism 56, Fig. 4), positioned in the line of sight of the first station (i.e., first station 22c, Figs. 1 and 4) for correcting for propagation distortion occurring between the first station and the interconnect;

a second adaptive optical module (i.e., transmitting beam focusing element 44, receiving beam focusing element 32 and adjustment mechanism 56, Fig. 4) positioned in the line of sight of the second station (i.e., second station 22d, Figs. 1 and 4) and in the line of sight of the first adaptive optical module for correcting for propagation distortion occurring between the second station and the interconnect (see col. 7, lines 16-24 and col. 9, lines 3-26).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 12-15, 17-23, 32-44, 46, 48, 51-57 and 63-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willebrand (US Patent No. 6,239,888) in view of Friedman et al (US Patent No. 6,278,100).

Regarding claims 12, 54 and 55, Willebrand teaches all the aspects of the claimed invention except fails to teach the step of correcting propagation distortions of the first and second optical beams includes a step of planarizing the wavefronts of the first and second optical beams, the step of planalizing the first and second optical beams being carried out by at least one adaptive optical module, the at least one adaptive optical module functioning in a closed-loop fashion. However, Friedman in US Patent No. 6,278,100 teaches the step of correcting propagation distortions of the first and second optical beams includes a step of planarizing the wavefronts of the first and second optical beams, the step of planalizing the first and second optical beams being carried out by at least one adaptive optical module, the at least one adaptive optical module functioning in a closed-loop fashion (Fig. 1, col. 6, lines 2-67 and col. 7, lines 1-14). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the step of correcting propagation distortions of the first and second optical beams includes a step of planarizing the wavefronts of the first

and second optical beams, the step of planalizing the first and second optical beams being carried out by at least one adaptive optical module, the at least one adaptive optical module functioning in a closed-loop fashion as taught by Friedman in the system of Willebrand. One of ordinary skill in the art would have been motivated to do this since Friedman suggests in column 6, lines 2-67 and col. 7, lines 1-14 that using such the step of correcting propagation distortions of the first and second optical beams includes a step of planarizing the wavefronts of the first and second optical beams, the step of planalizing the first and second optical beams being carried out by at least one adaptive optical module, the at least one adaptive optical module functioning in a closed-loop fashion have advantage of allowing reducing the errors of the optical beams.

Regarding claims 13, 41, 56, 57 and 64, the combination of Willebrand and Friedman teaches further including the step of compensating for tilt and focus errors of the first and second optical beams, the step of compensating for tilt and focus errors being executed by at least one optical tilt-focus error compensator (Fig. 4 of Willebrand and Fig. 1 of Friedman).

Regarding claim 14, Willebrand further teaches wherein information is encoded onto the first optical beam at the first station, information is encoded onto the second optical beam at the second station, and wherein the first optical beam arrives at the second station as a diffraction-limited beam and delivers to the second station the information encoded onto the first optical beam at the first station, and the second optical beam arrives at the first station as a diffraction-limited (see Figs. 1 and 4).

Regarding claims 15, 35 and 66, Willebrand further teaches the first and second stations comprises at least one transceiver (see Figs. 1, 2, 4, 10 and 11).

Regarding claims 17, 36, 38, 46 and 67, the combination of Willebrand and Friedman teaches the first and second adaptive optical modules function in a closed-loop fashion (Figs. 1 and 4 of Willebrand and Fig. 1 of Friedman).

Regarding claim 18, Willebrand further reaches the first adaptive optical module (i) directs to the second adaptive optical module, a first optical beam received from the first station, and (ii) directs to the first station, a second optical beam received from the second adaptive optical module and originating from the second station; and the second adaptive optical module (i) directs to the first adaptive optical module, the second optical beam received from the second station, and (ii) directs to the second station, the first optical beam received from the first adaptive optical module and originating from the first station (Figs. 1 and 4 of Willebrand).

Regarding claims 19-21, 33, 47 and 52, the combination of Willebrand and Friedman teaches further comprising at least one optical tilt-focus error compensator for removing tilt and focus errors from at least one of the first and second optical beams (Figs. 1 and 4 of Willebrand and Fig. 1 of Friedman).

Regarding claims 22, 23, 34, 39, 40, 42-44, 53 and 65, the combination of Willebrand and Friedman teaches at least one of the first and second adaptive optical modules comprises an adaptive optical wavefront corrector and a wavefront error sensor (see Fig. 1 of Friedman).

Regarding claims 32, 51 and 63, the combination of Willebrand and Friedman teaches the adaptive optical modules comprise LCLVs, liquid crystal SLMs, deformable MEMS devices, optical MEMS-based SLMs, or liquid crystal cell with transparent electrodes, or any combination thereof (see Fig. 1 of Friedman).

Regarding claim 37, the combination of Willebrand and Friedman teaches in an optical system, a method of compensating for propagation errors in at least two counter-propagating optical beams, the method comprising the steps of:

(a) providing at least one adaptive optical module;

(b) receiving the at least two counter-propagating optical beams by the at least one adaptive optical module;

(c) detecting the propagation errors by the at least one adaptive optical module in each of the at least two counter-propagating optical beams;

(d) computing corrections to compensate for the propagation errors in each of the at least two counter-propagating optical beams,

(e) applying the corrections to the received counter-propagating optical beam; and

(f) sending corrected optical beam by the at least one adaptive optical module (Figs. 1 and 2 of Willebrand, col. 7, lines 16-24 and col. 9, lines 3-26, and Fig. 1 of Friedman, col. 6, lines 2-67 and col. 7, lines 1-14).

### *Allowable Subject Matter*

7. Claims 24-31, 48-50 and 58-62 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 1-5 and 7-10 are allowed.

### *Response to Arguments*

9. Applicant's arguments with respect to claims 1-5 and 7-68 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (571)272-3035.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye, can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

Hanh Phan

HANH PHAN
PRIMARY EXAMINER